MARCH, 1932

ENTOMOLOGICAL NEWS

Vol. XLIII No. 3

JOHN HENRY COMSTOCK, 1849-1931.
Portrait of 1884.

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Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

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ENTOMOLOGICAL NEWS

VOL. XLIII. MARCH, 1932 No. 3

The Probable Occurrence in the Thysanuroid Insect Machilis heteropus Silv. of a Structure Homologous with the Second Antenna.

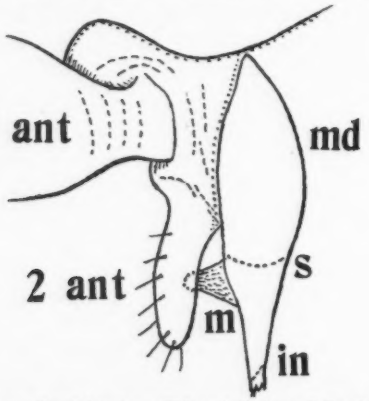
By G. C. CRAMPTON, Ph.D., Massachusetts State College, Amherst, Mass.

Several years ago, the late Mr. F. Muir sent to me a pencil sketch of a peculiar structure which he had found in a Machiloid insect, presumably *Machilis heteropus* Silv., which was probably captured in Hawaii, where Mr. Muir was living at that time. I no longer have the letter which accompanied the sketch, so that I am unable to say whether the structure in question occurs in only one, or both sexes of *M. heteropus,* but as I recall his description of it, the structure is a lobe-like projection occurring between the base of the antenna and the mandible, as is shown in the accompanying drawing, which I have made from the rough pencil sketch sent by Mr. Muir.

Mr. Muir suggested that, from its location, and the fact that it serves to connect the base of the antenna with the mandible, this structure might represent the lobe of a basal segment of the antenna ("ischiopodite") while the mandible might represent another lobe of a basal segment of the antenna. I pointed out to him that embryology would permit no such interpretation of these parts, and made the suggestion that this structure might represent the second antenna, which, according to Uzel, 1897 (Beitr. zur Entwicklungsgeschichte von Campodea staphylinus Westw., Zool. Anzeiger, 20, p. 125) is also preserved in the head of adults of *Campodea,* as a small lobe situated between the labrum and the maxilla, in the space left free by the retracted mandible (*teste* Snodgrass, 1928, Smiths. Misc. Collections, Vol. 81, No. 3, p. 59- who likewise finds a papilla in this region in the grasshopper *Dissosteira*).

I urged Mr. Muir to publish an account of this structure in *Machilis,* but other matters intervened, and this was never done. The matter should not be allowed to lapse, however, since I

think that this discovery is of the greatest importance. *Machilis* is one of the most "crustaceoid" of the Insecta and if it can be proved that a structure homologous with the second antennae of Crustacea actually occurs in any species of *Machilis,* this would be proof positive that the Insecta are descended from Crustacea, since the Crustacea are the only forms typically exhibiting two pairs of antennae. The other structures of *Machilis* are so "crustaceoid" that the occurrence of a second pair of antennae in *Machilis* is all that is needed to prove beyond all doubt that it is a more or less direct descendant of the Crustacean stock! I have therefore reproduced Mr. Muir's figure in the hopes that anyone having specimens of *Machilis heteropus* Silv., will examine both sexes of this insect and publish a detailed account of the structures in question — and if the embryology of *Machilis* can be studied with a view to tracing



The figure shows the sinistral mandible and the base of the sinistral antenna of *Machilis heteropus* Silv., in which there apparently occurs a pair of vestigial second antennae located between the bases of the antennae and the mandibles. 1, *ant* is the base of the antenna; 2, *ant* is the supposed second antenna; *md* is the mandible; *m* is the mola; *in* is the incisor region; and *s* is the suture dividing the mandible into a basal and distal region.

the development of the tritocerebral appendages in its embryo (and also the development of its paragnatha to prove that these are homologous with the paragnatha of Crustacea) such a study would be invaluable for deciding the moot question of the origin of the class Insecta.

In the meantime, I would suggest that the structure labelled *2 ant* in the accompanying figure of *Machilis heteropus* Silv., is actually the homologue of the second antennae of Crustacea, since it occupies exactly the correct position for such a structure (*i. e.* between the base of the first antenna and the mandible). Some species of *Machilis* is exactly the type of crustaceoid insect in which one would expect to find vestigial second antennae located in their normal position between the bases of the first antennae and the mandibles, instead of being in the unnatural position between the labrum and maxilla characteristic of the supposed vestiges of the second antennae in the adult of *Campodea,* or the small papilla supposedly representing the second antennae in *Dissosteira* (which is a rather specialized insect to have preserved vestiges of the second antennae which are lost even in the embryonic stages of most insects above the Apterygota). I have no reason to doubt that Mr. Muir's figure was correct in all essential details, and I am convinced that *Machilis heteropus* Silv., has actually preserved a pair of vestigial second antennae, if Mr. Muir's identification of the insect sketched by him is correct.

That the accompanying figure is of a Machiloid insect is proven by the fact that it has a typical Machiloid mandible with a set-off incisor region labelled *in* in the accompanying figure, and with a prolonged molar region, or mola, labelled *m* in the figure. There is also a typical suture labelled *s,* dividing the mandible *md* into a basal and distal region characteristic of *Machilis,* so that there can be no doubt that the figure was sketched from a Machilid originally, the only question in my mind being whether the identification of the Machiloid was correct or not, and on this account I would again urge those possessing specimens of *Machilis heteropus* to examine these insects and either publish on their findings, or allow me to study them with this in view, since the finding of such comparatively well developed relics of the second antennae in the crustaceoid insect *Machilis* is of intense interest to every student of the phylogeny of insects, and the importance of such a find cannot be overemphasized!

A New Species of Loboptera Brunner (Orthoptera: Blattidae, Pseudomopinae).

By MORGAN HEBARD, Philadelphia, Pennsylvania.

Dr. Roland Thaxter last year sent us a series of a small subapterous cockroach, which he had found common in rubbish and leaf litter in a small wood-lot, planted on the grounds of the Normal School of Agriculture at Llavallol, near Buenos Aires, Argentina.

This insect proves to represent a new species of the Old World genus *Loboptera,* which we take pleasure in naming in honor of its captor. We are convinced that it is an introduction in South America from southern Europe or northern Africa, where closely related species are native. Furthermore, it may be parthenogenetic in the Argentine, as all of the fifteen specimens secured are females.[1]

Loboptera thaxteri new species. Figures 1 and 2.

This insect is closely related to the south European *Loboptera decipiens* (Germar), differing in the structure of the female subgenital plate and in features of coloration. Some resemblance to *Loboptera maroccana* Bolivar is also shown, but that larger species is quickly distinguished by the solidly dark abdomen.

Type: ♀ ; Llavallol, Buenos Aires, Argentina. April, 1916. (R. Thaxter.) [Museum of Comparative Zoology.]

Agrees with *decipiens* in all structural features except the subgenital plate. Surface glabrous, microscopic hairs scarcely perceptible except caudad. Head slightly broader than deep, vertex rounding evenly into face, interocular width distinctly greater than that between the antennal sockets, minute ocellar spots indicated.[2] Palpi very short,[2] fourth joint about three quarters as long as fifth. Pronotum evenly weakly convex;[2] caudal margin almost transverse, weakly convex. Tegmina represented by pads[2] which faintly surpass the mesonotum, less than twice as long as greatest width; sutural margin briefly weakly divergent from costal margin, then evenly con-

[1] We know *Pycnoscelus surinamensis* to be almost always parthenogenetic in America, whereas in the Asiatic portions of its distribution males are often if not always as frequently found as females.

[2] These features are probably of generic rather than specific importance.

verging toward that margin to the rather broadly rounded apex. Supra-anal plate strongly transverse, triangular, with sides very broadly concave and apex broadly rounded (sometimes showing a trace of incision). Subgenital plate ample, with a mediolongitudinal distal cleft, thus forming two rounded triangular, slightly produced apical flaps, the area which they occupy concave (in this material, dried after immersion in a liquid preservative, these flaps are sometimes curled inward very strongly). Ventro-cephalic margin of cephalic femora armed with a series of heavy elongate spines which distad gradually de-

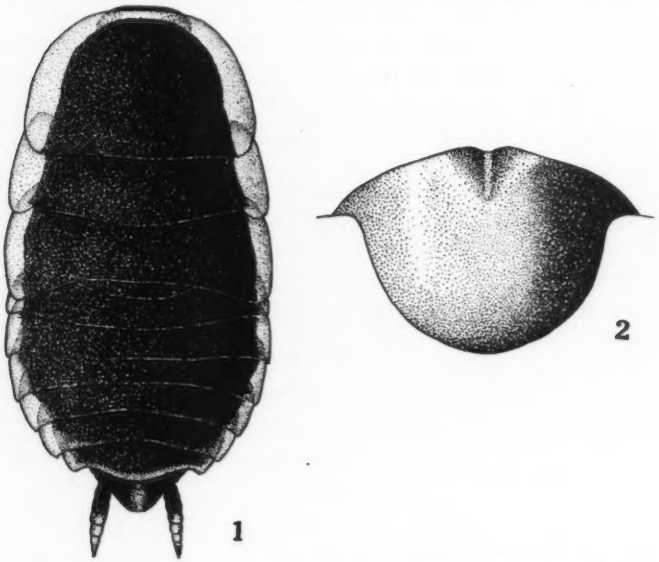


Fig. 1.—*Loboptera thaxteri* new species. Dorsal view of type. (x 6).
Fig. 2.—Same. Dorso-caudal view of subgenital plate, of female type. (Much enlarged.)

crease to a series of minute piliform spines, terminating in three heavy spines, elongate in strongly increasing ratio distad.[2] Caudal metatarsus slightly longer than combined length of the succeeding joints, with two rows of minute spines ventrad and a distal pulvillus; ventral surface of succeeding joints fully occupied by pulvilli. A moderately large arolium present between the simple, symmetrical tarsal claws.[2]

Surface shining blackish brown. Margined dorsad by a moderately broad buffy band which, unlike in *decipiens,* is continued around the cephalic margin of the pronotum and also covers all (instead of only slightly over half) but the sutural margin of the tegminal pads. Caudad the fifth and sixth abdominal tergites have their free margins narrowly paler, the succeeding tergites (two of these very narrow and often hidden) wholly dark, but the supra-anal plate buffy disto-mesad. Cerci dorsad solidly dark proximad but with distal half buffy, ventrad buffy with extensive proximal portions of proximal segments alone dark. Ocellar spots and limbs brownish buff. Abdomen ventrad, unlike in *decipiens,* with lateral margins (but not distal margin of subgenital plate) narrowly buffy.

The color differences from *decipiens* are more significant since the described series of *thaxteri* is very dark in general coloration but the pale markings are both more numerous and more extensive.

The fourteen paratypic females are divided between the Museum of Comparative Zoology and the author's collection.

Length of body 7.7 to 9.6, length of pronotum 2.13 to 2.84, width of pronotum 3.12 to 4.26, exposed length of tegmen 1.06 to 1.49, greatest width of tegmen .62 to .80 mm. (by micrometer).

Notes on Coleoptera.—No. 3.

By J. N. KNULL, Pennsylvania Forest Research Institute.

(Continued from page 45.)

BOSTRICHIDAE

XYLOBIOPS BASILLARE Say. Reared in numbers from dead wild grape vine collected at Mont Alto.

CERAMBYCIDAE

TESSAROPA TENUIPES Hald. Adults were reared from dead chestnut (*Castanea dentata* Marsh.) branches about 3/16 of an inch in thickness collected at Mont Alto. The insect was found to pass the winter in both the larval and pupal stages.

HYPERMALLUS INCERTUS Newn. This insect was found working in the thick outer bark of dead rock oak (*Quercus prinus* Linn.) in Clark's Valley. The larvae had made irreg-

ular galleries through the bark and were passing the winter in their pupal cells.

CENTRODERA PICTA Hald. A living unhardened adult was chopped from its pupal cell in the decayed part of a living yellow birch (*Betula lutea* Mich.) at Laporte, September 7.

ANOPLODERA RUBRICA Say. Reared from the dead decayed wood of hickory collected in Clark's Valley.

A. MINNESOTANA Csy. Reared from the dead decayed wood of hickory and black gum (*Nyssa sylvatica* Marsh.) collected in Clark's Valley.

A. BIFORIS Newn. This insect was found breeding in decayed hemlock (*Tsuga canadensis* Linn.) stumps at Cold Springs, Adams County.

A. MUTABILIS Newn. Reared from the dead decayed wood of willow and black gum (*Nyssa sylvatica* Marsh.), wild black cherry (*Prunus serotina* Ehr.) and black birch (*Betula nigra* Linn.) collected in Clark's Valley.

TYPOCERUS VELUTINUS Oliv. Reared from the dead decayed wood of hickory collected in Clark's Valley.

ENCYCLOPS COERULEA Say. Found breeding in the outer bark of living black ash (*Fraxinus nigra* Marsh.) on the Mont Alto State Forest.

NEOCLYTUS KIRBYI Auriv. Reared from the dead branches of post oak (*Quercus stellata* Wang.) collected in Clark's Valley.

ANTHOBOSCUS RURICOLA Oliv. Reared from the wood of dead red maple (*Acer rubrum* Linn.), linden (*Tilia americana* Linn.) and striped maple (*Acer pennsylvanicum* Linn.) collected in Clark's Valley.

CLYTUS MARGINICOLLIS Cast. Reared from the dead branches of long-leaved pine (*Pinus palustris* Mill.) collected at Cape Henry, Va.

PURPURICENUS HUMERALIS Fab. Reared from dead black locust (*Robinia pseudo-acacia* Linn.) seedling about ¾ of an inch in diameter collected in Clark's Valley.

P. AXILLARIS Hald. Reared from pruned branches of rock

oak (*Quercus prinus* Linn.) and post oak (*Q. stellata* Wang.) collected in Clark's Valley.

AEGOMORPHUS DECIPIENS Hald. Reared from dead blue beech (*Ostrya virginiana* Miller) collected at Bald Eagle and from dead willow collected in Clark's Valley.

LEPTURGES SIGNATUS Lec. Reared from dead branches of basswood (*Tilia americana* Linn.), black oak (*Quercus velutina* Lamb.) and chestnut (*Castanea dentata* Marsh.) collected in Clark's Valley.

HYPERPLATYS MACULATA Hald. Reared from a dead branch of willow collected in Clark's Valley

H. ASPERSA Say. Reared from dead shadbush (*Amelanchier canadensis* Linn.) branches collected in Clark's Valley.

ACANTHOCINUS NODOSUS Fab. Reared from the bark of dead pitch pine (*Pinus rigida* Miller) collected at Mont Alto. The larvae work through the bark and form pupal cells within it the latter part of July.

ECYRUS DASYCERUS Say. Adults reared from dead basswood (*Tilia americana* Linn.) branches collected in Clark's Valley.

EUPOGONIUS TOMENTOSUS Hald. Reared from dead long-leaved pine (*Pinus palustris* Miller) branches collected at Cape Henry, Va.

OBEREA SCHAUMI Lec. Adults reared from living large-toothed aspen (*Populus grandidentata* Mich.) and American aspen (*Populus tremuloides* Mich.) collected at various points on the Allegheny Plateau. Trees up to 3 inches in diameter are some times infested and the larvae do not work down into the roots as some of the other members of the genus do. The work is usually up the stem including side branches, with holes to the exterior at different points for exuding frass.

O. TRIPUNCTATA Swed. Reared from branches of living mocker nut hickory (*Cary alba* Linn.) collected in Huntingdon County; also from a living branch of witch-hazel (*Hamamelis virginiana* Linn.) collected in Clark's Valley.

O. TRIPUNCTATA var. *mandarina* Fab. Reared from a living branch of sweet viburnum (*Viburnum lentago* Linn.) collected at Pond Bank.

CURCULIONIDAE

EUSPHYRUS WALSHI Lec. Reared from dead bittersweet (*Celastrus scandens* Linn.) vine collected in Clark's Valley.

BRACHYRHINUS SULCATUS *Fab.* Numerous plants of English ivy (*Hedera helix* Linn.) were practically defoliated by the adults of this species which appeared in numbers the latter part of June. The adults are nocturnal and could not be found in the day time.

THYSANOCNEMUS BISCHOFFI Blatch. White ash (*Fraxinus americana* Linn.) seeds infested with the larvae of this insect were found at Good Siding, Franklin County, by Prof. G. S. Perry and Chester A. Coover. The larvae crawl from the seeds in the spring after they have fallen to the ground and enter the soil for pupation. Not more than one larva was found to a seed and dark spots on the outside of the infested seeds indicated the points where the eggs had been laid. Mr. Coover figured that 7.3% of the seeds on the trees were infested. The seeds from the tops showed 3.65% weeviling; the middle portions 6.85% and seeds from the bases of the trees showed 11.3% infestation. (Species determined by L. L. Buchanan.)

CEUTORHYNCHUS RAPAE Gyll. Adults were destructive to nasturtium foliage during June and the fore-part of July, at Mont Alto. The feeding was usually at the edges of the leaves. (Species determined by L. I. Buchanan.)

CRYPTORHYNCHUS FALLAX Lec. Reared from dead basswood (*Tilia americana* Linn.) branches collected in Clark's Valley. (Determined by Chas. Liebeck.)

SCOLYTIDAE

SCOLYTUS PICEA Sw. Near Bernice, small black spruce (*Picea mariana* Miller) affected by the 1930-31 drought were infested with this insect. The adults emerged from caged sticks in September.

CNESINUS STRIGICOLLIS Lec. This insect was found overwintering in the adult stage in small twigs of dead chestnut (*Castanea dentata* Marsh.) at Mont Alto. The adults had burrowed out the central portions of the stems and usually

two beetles were found in one gallery. (Determined by Dr. M. W. Blackman.)

MICRACIS OPACIOLLIS Lec. Adults found through the winter months in small dead chestnut (*Castanea dentata* Marsh.) twigs at Mont Alto.

CORTHYLUS PUNCTATISSIMUS Zimm. August 1, F. M. Trimble called the writer's attention to this species working in the stems of fetter bush (*Leucothoe catesbaei* Walt.) at Frazer.

CONOPHTHORUS CONIPERDA Sz. Dead adults of this species were found in small immature cones of pitch pine (*Pinus rigida* Miller) at Mont Alto.

PITYOPTHORUS PULCARIUS Zimm. This insect was found working in the immature cones of pitch Pine (*Pinus rigida* Miller) at Mont Alto, and in the small stems of Austrian pine (*Pinus laricio* var. *austriaca* Endl.) affected by the 1930-31 drought at Philadelphia. (Determined by Dr. M. W. Blackman.)

P. NUDUS Sw. Found breeding in the small dead branchlets of Scotch pine (*Pinus sylvestris* Linn.) at Pond Bank.

P. BELLUS Blackm. Adults were taken under the bark of dead Scotch pine (*Pinus sylvestris* Linn.) collected at Pond Bank on July 24. (Determined by Dr. M. W. Blackman.)

P. MUDUS Blackm. July 31, adults were found under the bark of black spruce (*Picea mariana* Miller) trees killed by drought near Bernice. (Determined by Dr. M. W. Blackman.)

P. PULCHELLUS Eich. Adults were found under the bark of pruned Austrian pine (*Pinus laricid* var. *austriaca* Endl.) branches at Mt. Carmel, August 1.

PITYOGENES LECONTEI Sw. Adults of this species were found under the bark of dead Scotch pine (*Pinus sylvestris* Linn.) at Pond Bank, on March 8; working under Virginia scrub pine (*Pinus virginiana* Miller) bark in Kansas Valley, Perry County, on May 11 and under the bark of red pine (*Pinus resinosa* Aiton) at York, on May 20.

Dr. M. W. Blackman kindly determined the specimens and compared the material with the type in the Leconte collection.

Since this species was described * from a unique female in

* J. M. Swaine — Tech. Publication No. 2, N. Y. State Col. Forestry, v. 16, No. 1, 1915.

the Leconte collection, a brief description of the male is as follows:

Robust, reddish brown in color. Head with front broad, slightly convex, punctate toward vertex, granulate punctate below, a shining flat impunctate median area; clothed with fine pubescence. Eyes oval, coarsely granulate, inner margin sinuate. Antennae lighter in color than the rest of the insect, club flattened, circular in outline, first and second sutures nearly straight.

Pronotum longer than wide, slightly wider than elytra, widest back of middle, constricted at base, sides subparallel, broadly arcuate anteriorly, anterior margin elevated, serrulate, surface covered with blunt asperities toward front, posteriorly coarsely but not closely punctate, a medium longitudinal raised smooth impunctate area and an oval lateral areas on each side, pubescence of disk sparse, longer and denser laterally.

Elytra with sides subparallel, accurate anteriorly, surface shining, coarsely punctured toward base, puntures diminishing in size and surface becoming somewhat rugose near declivity, punctures irregularly placed, those of interspaces nearly equal in size, pubescence long, sparse. A long slender tooth curved downward at tip, arising from opposite the end of the second atria, elevated margin of declevity with several blunt tubercles, a prominent tooth on each side near apex.

Size of males ranging from 2 mm. long, .8 mm. wide, to 2.8 mm. long and 1 mm. wide.

ANISANDRUS OBESUS Lec. Adults were chopped from their burrows in dying large-toothed aspen (*Populus grandidentata* Mich.) on July 3, at Promised Land Lake, Pike County. (Determined by Dr. M. W. Blackman.)

A. SAYI Hopk. Adults were found working in dying fire cherry (*Prunus pennsylvanica* Linn.) at Laporte, July 24, and dead chestnut (*Castanea dentata* Marsh.) branch in Clark's Valley, February 14. (Determination by Dr. M. W. Blackman.)

DRYOCOETES BETULAE Hopk. Adults, larvae and pupae of this insect were found under the bark of a dying mountain ash (*Pyrus americana* Marsh.) at Ricketts, on September 7.

LYMANTOR DECIPIENS Lec. Adults were found in a small branch of dead witch-hazel (*Hamamelis virginiana* Linn.) in Clark's Valley. (Determined by Dr. M. W. Blackman.)

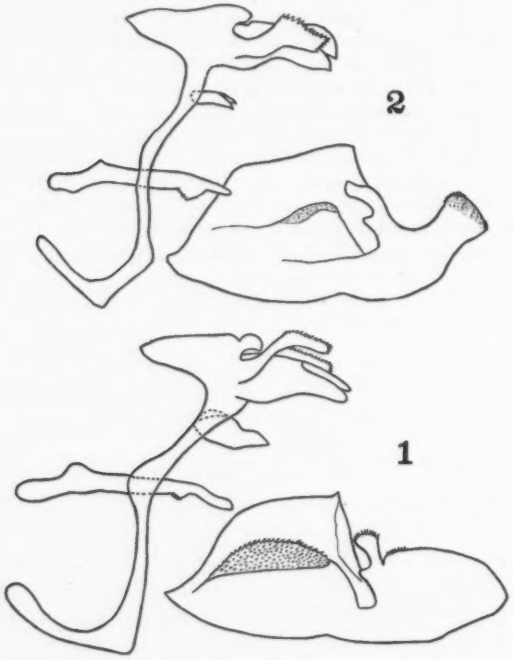
New Species of Pyrrhopyge (Lepid.: Hesperiidae).

By E. L. Bell, Flushing, New York.

Pyrrhopyge guianae new species. (Fig. I).

Male. *Upperside.* Primaries and secondaries greenish-black. *Beneath.* Both wings greenish-black, primaries paler at the base and inner marginal area. Fringes of both wings white, darkened at the apex of the primaries. Thorax and abdomen on both surfaces greenish-black. Shoulder-covers, tegulae and pectus greenish-black. Head, collar, palpi and anal tuft red. Antennae black, the club brown beneath.

Expanse: 58 mm.



Holotype male, French Guiana, in collection of the Academy of Natural Sciences, Philadelphia, Pa.

This species belongs in the division of the typical group of the genus *Pyrrhopyge* containing *zenodorus* Godman and Sal-

vin, to which it bears a superficial resemblance, the color of the head, collar, palpi and anal tuft being a little darker red. It also bears more or less superficial resemblance to the other members of this division, but may be distinguished from them all by the peculiar form of the male genitalia.

The flanges at the base of the uncus are rather narrow and serrate on the dorsal edge and apex. The claspers terminate in a broad, irregularly rounded arm with a few small serrations at the base of the dorsal edge, back of which rises a short projection, serrate on the rounded apex. The inner plate of the disc carries a considerable number of short teeth.

Pyrrhopyge cressoni new species. (Fig. 2).

Male. *Upperside.* Primaries and secondaries greenish-black. *Beneath.* Same color as above, the primaries at the base and below vein 2 paler; the secondaries with a rather irregular white basal area, poorly defined on the outer edge, and sometimes sprinkled with black scales. In the paratype from Ecuador there is also a small white dot on the underside of the primaries below the costal vein toward the base.

Fringes white on both wings, darkened at the apex of the primaries. Thorax and abdomen greenish-black on both surfaces. Shoulder-covers and tegulae greenish-black. Collar black. Head, palpi, pectus and anal tuft red. Antennae black, the club brown beneath.

Expanse: 54 mm.

Holotype male, Buena Vista, 75 km. n. w. of Santa Cruz, Bolivia, 450 m. alt. (Steinbach), and one male *paratype,* Ecuador, in collection of the Academy of Natural Sciences, Philadelphia, Pa.; one male *paratype,* same data as the holotype, in the collection of the author.

Named for Mr. E. T. Cresson, Jr., of Philadelphia, Pa.

This species is a member of the typical group of the genus *Pyrrhopyge* and belongs in the division containing *phidias* Linnaeus and the other species associated with it in having a white basal area of the secondaries beneath, from all of which *cressoni* may be superficially distinguished by the red pectus.

The termination of the claspers is somewhat like that of *draudti* Bell, but the projection arising from the dorsal edge

of the terminal arm at the base is quite different in shape. The flanges arising from the base of the uncus are very large and deeply serrate on the dorsal edge and apex, in *draudti* they are narrower and more elongate.

The measurement of expanse is twice the distance from the center of the thorax to the apex of one primary.

Biological Notes and New Records of North American Chermidae (Homoptera).

By F. D. KLYVER, San Mateo Junior College, San Mateo, California.

(Continued from page 40.)

ARYTAINA ASSIMILIS Crawford. CALIFORNIA.—Adults only: from *Ceanothus,* Black Mountain Road, Hillsborough, May 5, 1929; from *C. cuneatus,* Clark's Canyon, San Mateo, May 21, 1929; from same host, Tehachapi Pass, Kern County, April 13, 1930; from same host, Table Mountain, Fresno County, April 16, 1930.
Host: Not definitely known. (Probably *C. cuneatus.*) Nominal Hosts: *Ceanothus* spp.

ARYTAINA MINUTA Crawford. CALIFORNIA.—Adults and nymphs: from *Ceanothus cuneatus,* Clark's Canyon, San Mateo, May 20, 1929; same data, June 24, 1929. Adults only: from *Ceanothus,* summit of Peachtree Grade, west of Coalinga, December 8, 1929; from *C. cuneatus,* lower Kern River Canyon, west of Bodfish, June 19, 1931.
Host: *Ceanothus.*
Biological data incomplete.

ARYTAINA CEANOTHAE Crawford. CALIFORNIA.—Adults and nymphs: from *Ceanothus,* Black Mountain Road, Hillsborough, May 12, 1929; from *C. cuneatus,* Table Mountain, Auberry, Fresno County, April 16, 1930; from *C. thyrsiflorus,* San Remo, south of Carmel, March 30, 1931.
Host: *Ceanothus.*
Biological data incomplete.

ARYTAINA ACULEATA Crawford. CALIFORNIA.—Adults only: from *Cercocarpus betuloides,* Soda Creek, Napa County, May 3, 1931 (Keifer).
Host: Unknown. Nominal Host: *Cercocarpus.*

ARYTAINA PUBESCENS Crawford. CALIFORNIA.—Adults only: from *Purshia tridentata,* Rock Creek, northwest of Bishop,

June 19, 1931. IDAHO.—Adults only: from Antelope Bush, Craters of the Moon, June 29, 1930 (Annand).
Host: *Purshia tridentata.*

This species becomes very abundant. The nymphs are found among the younger branches and leaves, where they produce large amounts of wax secretion. Severe infestations are associated with the dwarfing of the host and the formation of a witches' broom effect in the parts most subject to attack.

PSYLLIA FIBULATA Crawford. IDAHO.—Adults only: from unknown host, wet meadow, near Craters of the Moon, June 29, 1930 (Annand); same data, Alturas Lake, August 2, 1930.
Host: Unknown. Nominal Hosts: None recorded.

PSYLLIA SINUATA Crawford. IDAHO.—Adults only: from grass and shrubs, head of Salmon River, July 19, 1930 (Annand).
Host: Unknown. Nominal Hosts: Grass and shrubs.

PSYLLIA MINUTA Crawford. CALIFORNIA.—Adults and nymphs: from *Purshia,* Marangue Peak, Argus Mountains, April 12, 1930. IDAHO.—Adults only: from unknown host, wet meadow, near Craters of the Moon, June 29, 1930 (Annand).
Host: *Purshia.* (Probably *P. tridentata.*)

This species and *Arytaina pubescens* Crawford, a distinct species, both have *Purshia tridentata* for a host. Although our biological data is incomplete, it appears that this species does not produce wax to the same extent as does *A. pubescens.*

PSYLLIA ALBA Crawford. CALIFORNIA.—Adults and nymphs: from *Salix,* Isabella Creek, Mountain Hamilton Range, October, 1922 (Ferris).
Host: *Salix.* Norminal Host: *S. longifolia.*
The available data are incomplete.

PSYLLIA HARTIGII Flor. NEW YORK.—Adults only: from pine, Cranberry Lake, July 26, 1920 (McLellan). NOVA SCOTIA.—Adults only: from unknown host, King's County, no date (Brittain).
Host: Unknown. Nominal Hosts: Pine, *Betula populifolia.*

PSYLLIA AMERICANA Crawford. CALIFORNIA.—Adults and nymphs: from *Salix,* Sacramento, March 30, 1929 (Keifer); from same host, south of Tehachapi, Kern County, April 13, 1930; from same host, Savory's Tule Pond, south of Fresno,

April 15, 1930; from same host, Old Fort Miller, Friant, Fresno County, April 16, 1930; from same host, Crystal Springs Lake, San Mateo County, May 1, 1930; from same host, San Remo, south of Carmel, March 30, 1931; from same host, sand dunes, San Francisco, April 3, 1931; from same host, Rock Creek, northwest of Bishop, June 19, 1931. Adults only: from *Salix* and *Artemisia heterophylla*, Sacramento, March 30, 1929 (Keifer); from pear trees, Andrus Island, Sacramento County, April, 1931 (Keifer); from same host, Hood, Sacramento County, April 16, 1931 (Keifer); from same host, Kelseyville, April 8, 1931 (Keifer); from *Salix*, Mountain Springs Canyon, Coso Mountains, April 12, 1930; from same host, Smith Creek, Mount Hamilton Road, April 18, 1931; from *Pinus monophylla*, south of Tehachapi, Kern County, April 13, 1930. IDAHO.—Adults only: from grass and shrubs, head of Salmon River, July 19, 1930 (Annand). NOVA SCOTIA.—Adults only: from *Salix*, 1924 (Brittain).
Hosts: *Salix* spp. Nominal Hosts: *Pinus ponderosa, P. monophylla, Artemisia heterophylla*, pear, grass, shrubs.

The nymphs are found, unaccompanied by conspicuous wax secretion, on the leaves, petioles, smaller branches, and buds. Early in the season they are found most abundantly on the axillary buds.

PSYLLIA AMERICANA MINOR Crawford. CALIFORNIA.—Adults and nymphs: from *Salix*, Crystal Springs Lake, San Mateo County, May 1, 1930; from same host, San Remo, south of Carmel, March 30, 1931; from same host, sand dunes San Francisco, April 3, 1931; from same host, Rock Creek, northwest of Bishop, June 19, 1931. Adults only: from *Salix*, Donner Pass, Placer County, July 16, 1929; from same host, Corral Hollow, southwest of Tracy, November 30, 1929; from same host, lower Kern River Canyon, west of Bodfish, June 19, 1931; from *Baccharis viminea*, Corral Hollow, November 4, 1929 (Annand); from pear trees, Andrus Island, Sacramento County, April, 1931 (Keifer); from same host, Kelseyville, April 8, 1931 (Keifer). UTAH.—Adults only: from willow, Hooper, October 14, 1927 (Pack: Knowlton).
Hosts: *Salix* spp. Nominal Hosts: *Baccharis viminea*, pear.
Biology similar to that of species.

PSYLLIA MAGNICAUDA Crawford. CALIFORNIA.—Adults and nymphs (?): from *Prunus* sp., Rock Creek Gorge, northwest of Bishop, June 19, 1931.
Host: *Prunus* sp. (?)

A number of nymphs were taken with the adults from the same plants. These nymphs may not be those of this particular species, inasmuch as they are very distinctly *triozine* in form, superficially resembling those of *Trioza maura* in structure and habit. This situation is especially interesting because of the great number of adults of *P. magnicauda* found on several plants from which only this species was taken with the nymphs.

PSYLLIA STRIATA Patch. CALIFORNIA.—Adults only, from *Betula fontanalis,* Rock Creek, northwest of Bishop, June 19, 1931. NOVA SCOTIA.—Adults only: from unknown host, King's County, June, 1924 (McLellan).
Host: *Betula.* Nominal Host: *Corylus rostrata?*

According to Miss Patch, the nymphs are found on the leaves and terminal leaves and shoots of *Betula.* The nymphs cover themselves with inconspicuous wax. The adults emerge late in June in Maine.

PSYLLIA BREVISTIGMATA Patch. CALIFORNIA.—Adults and nymphs: from *Cercocarpus,* Santa Lucia Mountains, April 15, 1923 (Ferris); from same host, Rock Creek, northwest of Bishop, June 19, 1931; from *C. betuloides,* Stanford University, April 10, 1930 (Duncan), Nymphs only: from same host, south of Tehachapi, Kern County, April 13, 1930.
NEVADA.—Adults and nymphs: from *C. ledifolius,* Zephyr Point, Lake Tahoe, July 16, 1929. Adults only: from *Juncus,* Spooner, Tahoe-Carson City Road, July 16, 1929.
Hosts: *Cercocarpus betuloides* and *C. ledifolius.* Nominal Host: *C. parviflorus.*

This species has been found wherever an effort has been made to find it on *Cercocarpus,* but it is not known to ever occur in abundance. The nymphs occur on the ventral side of the leaves. The wax secretion produced is given off in the form of long, straight, transparent, and somewhat glistening brownish threads. These threads do not intermingle to form a cottony wax.

PSYLLIA FLOCCOSA Patch. NOVA SCOTIA.—Adults only: from *Alnus,* no date (W. H. Brittain).
Host: *Alnus.*

According to Miss Patch, the nymphs appear early in the spring, when they are found on the ventral side of the leaves. They produce an abundance of white, flocculent wax.

PSYLLIA ASTIGMATA Crawford. CALIFORNIA.—Adults and nymphs: from *Prunus emarginata,* Rock Creek, northwest of Bishop, June 19, 1931. Nymphs only: from same host, Chagoopa Creek, southern Sierra Nevada, 7000 feet, June 21, 1923 (Ferris); from *Prunus,* Donner Pass, Placer County, July 16, 1929; from *P. emarginata,* General Grant National Park, July 12, 1930. NOVA SCOTIA.—Adults and nymphs: from unknown host, no date (W. H. Brittain).
Host: *Prunus emarginata.* Nominal Host: *P. demissa.*

This species frequently becomes excessively abundant. The nymphs produce large amounts of floss-like, cottony wax. They usually occur on the ventral side of the leaves but in severe attacks they are found on the petioles, smaller branches, flowers and fruit, moving about freely and carrying their wax secretion, plume-like, about with them. Even in cases of very abundant attack the host does not seem to suffer any serious loss of vitality. The nymphs of this species superficially resemble those of *Psyllia mali.*

PSYLLIA TRIMACULATA Crawford. NEW YORK.—Adults only: from *Prunus,* Cranberry Lake, 1925 (W. H. Brittain).
Host: Unknown. Nominal Host: *Prunus.*

PSYLLIA ALNI AMERICANA Crawford. CALIFORNIA.—Adults and nymphs: from *Alnus rhombifolia,* San Francisquito Creek, Stanford University, May 3 and June 20, 1929; from same host, southern end of Lake Tahoe, July 15, 1929; from same host, Smith Creek, Mount Hamilton Road, April 18, 1931; from same host, Placerville, July 15, 1929. Adults only: from unknown host, Placerville, no date (E. O. Essig: Keifer). IDAHO.—Adults only: from unknown host, Alturas Lake, Stanley Basin, July 19, 1930 (Annand). WASHINGTON.—Adults and nymphs: from *Alnus,* Cathlamet, August 7, 1923 (Duncan).
Host: *Alnus rhombifolia.*

The nymphs occur, sometimes in exceedingly great abundance, on the younger leaves and smaller branches early in spring. They are usually conspicuous because of the vast amounts of white wax secretion, which may sometimes completely cover the leaves. Alder trees at the south end of Lake Tahoe and at Bass Lake, Madera County, California, were defoliated to a considerable degree, apparently by the chermid.

PSYLLIA BUXI (L.) CALIFORNIA.—Adults and nymphs: from *Buxus,* San Jose, June 12, 1920 (R. D. Hartman); from *B. sempervirens,* North Clarmont Street, San Mateo, May 5, 1929; same host, North Eldorado Street, San Mateo, May 10, 1929; from same host, Ellsworth Avenue, San Mateo, June 30, 1931. Nymphs only: from same host, North Clarmont Street, San Mateo, April 15, 1929; from same host, Parrott Estate, San Mateo, May 18, 1929.
Host: *Buxus sempervirens.*

The nymphs attack the young terminal leaves causing them to curl into a loosely cabbage-like growth. In severe infestations, which apparently are not uncommon, these growths considerably impair the beauty of the plants.

PSYLLIA CAUDATA Crawford. IDAHO.—Adults only: from unknown host, Alturas Lake, Stanley Basin, July 19, 1930 (Annand).
Host: Unknown. Nominal Host: *Alnus tenuifolia.*

Cordylura tricincta Loew, a Leaf-miner on Smilacina racemosa (L) Desf. (Dipt.: Scatophagidae).

By S. W. FROST, The Pennsylvania State College.

For a number of years the writer has noticed mines on the leaves of *Smilacina racemosa.* In 1924,[1] he recorded the leaf-miner as an undetermined species of Diptera. In 1928,[2] the same miner was noted, its habits briefly summarized and the mine figured. At this time, adults had not been reared and it was thought to be a species of *Parallelomma.* Later an adult emerged and Mr. E. T. Cresson determined it as *Hexamitocera flavida* Coq. Mr. C. H. Curran has recently studied the types of this subfamily and states that *H. flavida* Coq., is a synonym of *Cordylura tricincta* Loew.

Cordylura tricincta Loew, appears to be somewhat rare in collections. It was originally described by Loew [3] as *Coenosia tricincta* from the White Mountains, New Hampshire. As *Hexamitocera flavida,* Coquillett [5] recorded it from Franconia, N. H. Mr. E. T. Cresson took one specimen at Caroline, New York, from which the record in the "List of Insects of New York"[4] was obtained. In the National Museum, there is one specimen, besides the type, collected by Dr. J. M. Aldrich from Moscow, Idaho. Mr. C. W. Johnson [6] took it at Eastport, Maine, and he has a specimen taken by Dr. C. P. Alexander at Orono, Maine. The writer has found the mines of

this species fairly common at Ithaca and Florida, N. Y., and Arendtsville, Pa.

Egg. The egg is pure white and always laid at the base and on the under surface of the leaf. It is about 1 mm. long and .5 mm. in diameter, somewhat larger than most leaf-mining eggs with the exception of the Anthomyiidae, and strikingly conspicuous against the green color of the leaf. It is distinctly different from the eggs of any of the other North American leaf-mining insects. In cross section, an egg shows a central rounded portion with two lateral wing-like expansions which, in the plump newly laid egg, are folded over the egg and nearly meet down the center. After the egg hatches, the egg shell shrivels and the lateral expansions spread so that the egg has three longitudinal ribs.

Larva. There is nothing paricularly striking about the larva. It is elongate and resembles, superficially, an Anthomyid larva, especially *Hylemyia.* The anterior spiracles are fan-shaped with twelve lobes, (Frost [1] Plate XII, fig. 13). The intersegmental areas are thickly beset with six or eight rows of ambulatory setae. The posterior spiracles each have three openings, (Frost [1] Plate XI, fig. 17). Surrounding the posterior spiracles is a circle of eight rather prominent fleshy tubercles.

Puparium. The puparium is elongate, chestnut brown in color with distinctly protruding spiracles and with a circle of prominent tubercles as in the larva. The anterior end of the larva is somewhat truncate on the dorsal and ventral sides.

Mine. The larva, on hatching, enters directly into the leaf and starts mining. The mine is confined, more or less, between the parallel veins of the leaf which are broadly spaced. An elongate blotch mine is produced from the base towards the tip of the leaf. Usually but one mine occurs on a leaf although sometimes two eggs are laid side by side and the larvae from these eggs produce a common mine. In mining, the parenchyma and palisade cells are entirely removed leaving only the upper and lower epidermis. The fresh mine is pale green or white in color. Later the mine turns brown or red along the edges.

Host plant. Cordylura tricincta has been reared only from false solomon's seal, *Smilacina racemosa.* Similar eggs and mines have been found on *Polygonatum commutatum.* As the eggs on the latter plant are invariably laid upon the upper surface of the leaves, there is no doubt that a closely related species is envolved.

Adult. Some difficulty was experienced in rearing adults of *Cordylura tricincta.* Tenanted mines were fairly common in New York and Pennsylvania where *Smilacina racemosa* grew, larvae matured freely in the mines and puparia were obtined in considerable numbers, but it was found difficult to secure adults from these puparia. The pupal period is long and it is not easy to maintain satisfactory temperature and humidity during this long period to assure a fair emergence of adults. Larvae that transformed June 30, 1927, did not emerge until May 1, 1928. There is obviously only one generation a year. The adults are most active during May and June.

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An Additional Record for Dynastes tityus in Pennsylvania (Coleop.: Scarabaeidae).

[Mr. Samuel Henshaw has kindly sent me the following information concerning this species from Asa Fitch's manuscript notes. See the NEWS, xli, pp. 195, 305, 1930. P. P. CALVERT.]

Fitch's manuscript notes were acquired by Mr. Scudder, who later gave them to me when I was connected with the Boston Society of Natural History. I planned having them bound and giving them to the Society, as Mr. Scudder left his library to the Society. They are on loose sheets and not easily or inexpensively bound and save for two or three small volumes given to the Society in his name many years ago, I have them still.

Fitch's records are:

"Date and Situation

♂ 3360 July 1847 from Thaddeus A. Culbertson, Chambersburgh, Pa.
♀ 6077 July 1852 from Wm. S. Robertson, Tallahassie, Ark.
♂ 1123 July 1855 from Wm. S. Robertson, Tallahassie, Ark.
♀ 1201 July 1852 from Sara S. [?] Fitch, Jackson, Mi.

SAMUEL HENSHAW.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within ( ) follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞ *Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

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ANATOMY, PHYSIOLOGY, ETC.—Abbott, C. E.—Methods of orientation in dragonfly larvae. [5] 33: 124-126 **Barnes, T. C.**—Kinesthetic sense of insects. [7] 24: 824-826. **Bito, S.**—The influence of food upon the nutrition of insects. (Japanese, resume in English.) [Bul. Sci. Kjusu

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HEMIPTERA.—***Barber, H. G.**—A new Oncerotrachelus from Cuba (Reduviidae). [19] 26: 185-186. ***Beamer, R. H.**—Some Erythroneura (grape leaf hoppers) of the Maculata group (Cicadellidae). [4] 63: 268-270, cont. **Bibby, F. F.**—Coccoids collected on wild plants in semi-arid regions of Texas and Mexico. [6] 39: 587-591, ill. **Bibby, F. F.**—Coccoids collected on wild plants in semi-arid regions of Texas and Mexico. [19] 26: 189-194. ***Drake & Harris.**—Further notes on the genus Rhagovelia. Veliidae. [55] 6: 33-35. **Essig, E. O.**—The negro scale in California. [55] 6: 36. **Essig, E. O.**—Note on the redwood scale. [55] 6: 48. ***Evans, J. H.**—A preliminary revision of the Ambush bugs of North America (Phyma-

tidae). [7] 24: 711-738, ill. **Evans, J. W.**—Notes on the biology and morphology of the Eurymelinae (Cicadelloidea). [Pro. Linn. Soc. N. S. W.] 56: 210-226, ill. ***Gillette & Palmer.***—The aphidae of Colorado. [7] 24: 827-934, ill. **Goding, F. W.**—Synonymical notes on Membracidae. II. [7] 24: 935-936, ill. ***Harris, H. M.***—Nabidae from the state of Paraná. [An. Mus. Zool. Polonici] 9: 179-185. ***Knight, H. H.***—Three new species of Cyrtorhinus from North America (Miridae). [19] 26: 171-173. ***Knight, H. H.***—Descriptions of four new species of Eustictus (Miridae). [5] 33: 121-123. ***Lawson, P. B.***—The genus Alapus (Cicadellidae). [103] 5: 29-31. ***Mendes, L. O. T.***—Uma nova especie do genero Eucalymnatus (Coccidae). (S). [Revista Ent.] 1: 395-400. **Myers, J. G.**—Heteroptera in ocean drift. [5] 33: 110-115. **Osborn, H.**—Early work and workers in American Hemipterology. [7] 24: 679-685. **Pickles, A.**—A description of Tomaspis bodkini, (Cercopidae) from British Guiana. [Stylops] 1: 14-15, ill. **de la Torre-Bueno, J. R.**—Biting bugs. [19] 26: 176.

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